ENVIRONMENTAL
Fact Sheet

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

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Extending Bedrock Well Casings

INTRODUCTION

The bacterial quality of the water from a bedrock well (also called "artesian" or "drilled") is normally very reliable. The principle exception occurs when the top of a bedrock well is cut off below the ambient ground level, and thus, subject to flooding. This often results in the leakage of unfiltered surface water directly into the well. Surface water typically contains total, fecal, and e-coli bacteria.

The purpose of this document is to provide information relative to raising the top of a bedrock well casing above the ambient ground level. The top of the well is commonly called the "wellhead." A buried wellhead is a serious problem that should be corrected **unless you are absolutely sure that the wellhead will not be flooded, ever!**

WELL CONSTRUCTION STANDARD

New Hampshire well construction rule We 602.02(e)(1) requires bedrock well casings to extend above the ambient ground surface a minimum of eight inches or more. This requirement has been in effect since 1985. An exception is allowed only if the projection of the wellhead would create a safety hazard.

Wells constructed before July 2, 1985 are not required to conform to this rule. However, it is highly recommended that older wells be upgraded to current New Hampshire standards where possible. *In addition, New Hampshire law RSA 482-B:15 states, "all materials and construction practices used in the construction of a new well or pump installation, or in the maintenance, repair or replacement of any well or pump installation, shall conform with rules adopted by the Water Well Board."*

PITLESS ADAPTOR DESIGN

The normal design of a modern bedrock well ensures that leakage can not enter the interior of the well by requiring that the top of the well be above any possible flood level. This is achieved by using a so called "pitless adaptor." This configuration places the top of the well above the level of flooding while allowing the pressurized well water to exit the casing below the ground level in a way that ensures no leakage of contaminants into the well, and provides protections of the pressurized water line from freezing.

Value of A Pitless Adaptor

In addition to preventing bacterial contamination, a pitless adaptor also provides the following additional benefits:

- Easy access for all-weather replacement of a submersible pump. This will prevent costly delay caused by the difficulty in excavating frozen soil during the winter.
- Provides an unmistakable indicator of the well's location relative to inadvertent placement of a leach field on adjacent properties or damage by heavy vehicles passing over the well.

Evaluate the Potential for Flooding of the Well Pit

The only justification for a buried wellhead is a safety issue. To determine if an existing buried wellhead is subject to flooding one can look for staining caused by flood waters on the inside walls of the well pit. If the staining is above the top of the bedrock casing, an extension of the casing is absolutely necessary. It is not reasonable to believe that the top of the buried well can be made water tight so as to be safe in the event of a flood.

If there is no staining (meaning there is **never** any water buildup in the pit), or the maximum level of staining is **noticeably** below the top of the well, than extension of the well casing may arguably be deferred for the moment. If you choose not to extend the casing, the pit should be checked periodically during spring snow melt and after very heavy rain events to determine the flood level.

Response to Wellhead Flooding in Hillside Locations

Where a well with a buried wellhead is located on a hillside, it may be possible to lower the flood risk without raising the wellhead by installing a "gravity flow" drain. This drain would be installed at the bottom of the pit and would discharge by gravity to "above ground." Using a sump pump to dewater the wellhead pit is not recommended due to the eventual failure(s) expected of any mechanical device and its electrical service.

Response When the Flooding Is Caused by River or Lake

When a well is located in the flood plain of a lake or river, the typical approach would be to bring in additional fill material to mound up around the immediate outside of the well, and to

raise the casing using a pitless adaptor configuration. When grading the backfill around the well, keep the backfill slope shallow on one side so that a well rig may be easily positioned above the well for future maintenance. Mobilization of well drilling equipment could be associated with pulling the pump or deepening the well for more flow.

OPTIONS FOR RAISING THE WELL CASING

Before and after drawings of a well casing extension are shown on page 4. Well code rules require that when extending the casing, the same casing material be used as were used in the main lower casing.

Threaded Steel Casing

When the casing is steel the extension can be attached by using either a threaded or welded connection to the existing casing. If there are threads on the steel casing, they would be cleaned of rust and a threaded steel coupling of same size attached. Teflon tape or plumbers' "sealer" would be used to ensure a watertight connection.

Where there are **no threads** on the existing casing, an off-the-shelf coupling can be **machined** so as to just fit over the outside diameter of the existing casing. The cost of this machining is quite reasonable. You can also purchase these remanufactured slip couplings for particular

dimensions. Please see the details on the graphic of page 4. The bottom half of the coupling is then welded to the well casing on the inside of the coupling, and the new steel casing extension can be threaded into the top threaded section of this coupling. In another option, silicone sealant is applied to the existing casing, and the new machined coupling is driven down over the existing casing.

PVC Casing

Where casing material is PVC we suggest installation of a protective marker to the finished area to ensure safety from cars or snowplows. These markers can be large stone or concrete filled steel pipes set into the soil.

Rubber Sleeve

If the existing casing is PVC, a circular continuous rubber collar that spans both the existing casing and the new extension is normally used. This assembly is made water tight by use of stainless steel screw clamps around both the existing and new casings.

PVC Hard Coupling

PVC coupling and solvent welding chemicals can also be used.

FOR MORE INFORMATION

For more information, please call the Water Well Board at (603)-271-1974. For a complete list of all water supply fact sheets please request **WD-WSEB-15-2**. We would appreciate your comments and suggestions pertaining to this fact sheet. Drinking water fact sheets are available through the DES web site at: **http://www.des.nh.gov/WSEB** then select: **fact sheets.** Please check the DES internet site annually for updates to this document. *9/02*